

# **Performance Evaluation of Additional Water Supply Measures**

*by*

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***Presented to the***

***WRAC Lake Okeechobee Committee***

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# **Additional Water Supply Performance Measures**

- **Lake Okeechobee Minimum Flows and Levels**
- **Temporary forward pump operations and unmet needs**
- **Level of certainty for Lake users**
- **Lake stage impacts to direct users of the Lake**

# Lake Okeechobee Minimum Flow and Level Performance Measure

- Performance measure based on existing District rule (40E-8 F.A.C.)
  - Exceedence = stages below 11 ft for more than 80 days
  - Violation = more than one exceedence within six years

# Lake Okeechobee Minimum Flow and Level Performance

Performance measure	Base case	TSP <sup>1</sup> . with lowered WST <sup>2</sup> .	TSP with existing WST
# MFL exceedences	3	7	7
Ave. days per exceedence	120	173	158
Longest exceedence	142	420	412
# MFL violations	1	5	5
Total days <11.0 ft.	524	1471	1281
# years lake <11.0 ft.	7	15	14

<sup>1</sup>Tentatively Selected Plan

<sup>2</sup>Water Shortage Trigger

# **Lake Okeechobee MFL Performance: Conclusions**

- Number of MFL exceedences and violations increase significantly between the base condition and the TSP
- The TSP with the existing water shortage trigger line does not significantly improve the MFL performance
- The existing MFL criteria should be revisited to confirm if it defines significant harm

# Temporary Forward Pumps Performance Measures

- Number of events when pumps are operated
  - Pumps on when lake drops to 10.2 ft
  - Pumps off when lake rises to 11.2 ft
- Average duration of each event
- Average amount of unmet needs
  - pump capacity or water shortage cutbacks
  - Sub-set of total unmet needs
- Average deliveries to the LEC urban areas from the Lake
- Lowest lake level

# Temporary Forward Pumps Performance

Performance measure	Base case	TSP <sup>1</sup> . with lowered WST <sup>2</sup> .	TSP with existing WST
# of events when pumps are used	3	8	6
Ave. days per event	70	124	126
Ave. unmet need; LOSA	40,400 ac ft	94,050 ac ft	123,690 ac ft
Ave. LEC urban deliveries	13,375 ac ft	17,840 ac ft	20,254 ac ft
Lowest lake stage	9.6 ft	8.8 ft	9.1 ft

<sup>1</sup>Tentatively Selected Plan

<sup>2</sup>Water Shortage Trigger

# Temporary Forward Pumps

## Performance: Conclusions

- The frequency and average duration of water shortage events requiring the use of forward pumps increases significantly from the base condition to the TSP
- Average unmet needs incurred when the temporary forward pumps are operational increase under the TSP when compared to the base condition
  - Most of the unmet needs are caused by water shortage cutbacks not pump capacity
- The LEC urban deliveries when forward pumps are operating represent a small percent (5 to 15%) of the total deliveries
- Changes to the water shortage trigger lines significantly increase cutbacks to users but only raises the lowest lake stage by 0.3 ft



# **Level of Certainty Performance Measures**

- **Number of water shortage events in the 36 year simulation period**
- **Number of forward pump events in the 36 year simulation period**
- **Associated Level of Certainty for both**
  - **Water use permit LOC target is 1 in 10**

# Level of Certainty Performance

Performance measure	Base case	TSP <sup>1</sup> . with lowered WST <sup>2</sup> .	TSP with existing WST
# of water shortages	7	7	14
Associated Level of Certainty	1 in 5.1	1 in 5.1	1 in 2.6
# of forward pump events	3	8	6
Associated Level of Certainty	1 in 12	1 in 4.5	1 in 6

<sup>1</sup>.Tentatively Selected Plan

<sup>2</sup>.Water Shortage Trigger

# **LOSA Level of Certainty: Conclusions**

- Level of certainty between base and TSP are about equal
- The TSP with the existing lake water shortage trigger line cuts existing users' level of certainty in half
- The frequency of reliance on the forward pumps more than doubles between the base condition and the TSP

# Lake Stage Impacts to Direct Users of the Lake

- Determine calculated lowest stage of lake
- Compare this elevation to intake limits of existing public water supply utilities, commercial/industrial and agricultural uses which directly withdraw water from the lake or rim canal

# Lake Stage Impacts to Direct Users of the Lake: Results

- Lowest Lake stage base condition: 9.6 ft
- Lowest Lake stage TSP: 8.8 ft
- Public water supply utilities contacted
  - Pump intakes sufficient
  - Concerns regarding shoaling
  - Alternative sources online in 2008
- Commercial/Industrial and Ag contacted
  - Some pump intakes not low enough
  - Contingency plans needed
  - Additional research needed

# Water Supply Factors to Consider

- The TSP keeps water users whole but with increased risks associated with increased frequency and duration of extreme low lake levels.
- Is the risk of increased frequency and duration of low lake events reasonable to all affected parties?
- Can/should the lake continue to be relied on as a water supply source for both LOSA and drought protection for the LEC urban areas

# Water Supply Factors to Consider

- The analysis of the TSP is good for speculating on the probability of extreme low lake levels but the degree of risk will change in the near future as additional flexibility is added
  - Permanent forward pumps
  - Reservoirs and additional storage
  - Revised regulation schedule

# Water Supply Factors to Consider

- If LOSA's level of certainty is less than 1 in 10, how should the District deal with requests for new demands?
  - How do lake water demands change as the LOSA landscape changes
  - What are the water supply benefits associated with the upcoming projects and will they be sufficient to allow all permit uses to achieve a 1 in 10 LOC
  - How are new water supply demands defined in instances where land use changes occur



# Potential Action Items

- Revised Lake Okeechobee water shortage management criteria should be incorporated into the LORRS process
- Lake Okeechobee MFL criteria should be revisited and revised if necessary
- Permanent forward pump specifications need to be agreed upon for design and construction
  - Cost/benefit/risk considered
  - Do we size for LEC/LOSA demands combined or separated
- Drought preparation for users that withdraw directly from the lake
  - Facilities versus conveyance constraints
  - Who is responsible for what and when

# Questions?